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ABSTRACT

The following course outline has been prepared as a guide to help the student develop the skills and understanding to succeed in the broad field of data processing. A prerequisite to this course is Programming and Operations Lab 2. The class meets 2 hours per day for 90 clock hours and is made up of nine blocks of instruction (orientation, software systems, Common Business Oriented Language (COBOL) Language Structure, COBOL Programming language, table handling, segmentation, COBOL compiler, accessing and processing techniques, and a Quinmester posttest) which are broken down into several units each. Included are the course goals, specific block objectives, a 10-item bibliography, and Quinmester posttest samples and answer keys. (Author/BP)

ED 096396

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AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

V-16

Course Outline
DATA PROCESSING TECHNOLOGY - 8025
(Software Systems and Cobol - Advanced)
Department 73 - Quin 8025.35

ED 001 852

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1973

D A D E C O U N T Y P U B L I C S C H O O L S

1 4 5 0 N O R T H E A S T S E C O N D A V E N U E

M I A M I, F L O R I D A 33132

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Software Systems and Cobol - Advanced)

Department 73 - Quin 8025.35

county office of

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Dade County Public Schools
Miami, Florida 33132

December, 1972

Published by the School Board of Dade County

Course Description

8122	73	8025.35	Software Systems and Cobol - Advanced
State Category Number	County Dept. Number	County Course Number	Course Title

Using the skills and knowledge gained from Programming and Operations Lab II, the students are introduced to software systems programs. The purpose of conversion programs is studied while exploring the various programming languages made possible by these programs. Emphasis is placed on the Cobol language while solving programming problems. The output of the Cobol compiler is studied and provides a foundation for working with other compilers in other courses or on the job.

Indicators of Success: The student must have met the objectives of Programming and Operations Lab II prior to enrolling in this course.

Clock Hours: 90

PREFACE

The following course outline has been prepared as a guide to help the student develop the skills and understanding to succeed in the broad field of data processing. Problems are presented to the student to allow him to apply techniques already learned and to increase his knowledge of ways to solve processing problems.

In presenting the material outlined in this course, the instructor uses lectures, presentation, student participation, demonstration, and student projects as methods of instruction. After instruction and practice on the application that has been studied, evaluation of the student's skill and understanding is made.

Preparation for a future career in the field of data processing includes the development of proper attitudes and a standard of ethics found to be desirable in employees. There is an opportunity provided for the student to learn several programming languages throughout the course. Application of file processing techniques, programming techniques, and testing and debugging techniques exposes the student to problems that are common in business data processing.

This elective course is one of a series designed for quinmester use. Students who have met the objectives of Programming and Operations Lab II should be admitted to this course.

The class meets two hours per day for 90 clock hours. The outline lists the information the student must learn. It is made up of nine blocks of instruction which are further broken down into several units each.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee,

and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

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with Suggested Hourly Breakdown

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Student Responsibilities	1
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Input/Output Executives	1
Operating Systems	1
Advanced Concepts/Terms	2
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Rules of Grammar	2
Programming Worksheet	2
Notation and General Formats	2
IV. COBOL PROGRAMMING LANGUAGE (22 Hours)	
Divisions	2
Procedural Statements	2
V. TABLE HANDLING (6 Hours)	
Definition of Tables	2
Specification of Occurrence Numbers	3
VI. SEGMENTATION (6 Hours)	
Types of Segments	3
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VII. COBOL COMPILER (6 Hours)	
Compiler Input	3
Initial Compilation and Recompilation	3
Error Comments	3
VIII. ACCESSING AND PROCESSING TECHNIQUES (6 Hours)	
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GOALS

Upon completion of Introduction to Software Systems and Cobol Programming, the student must be able to demonstrate:

1. An understanding of the need for ethical practices as an employee in the field of data processing.

2. An understanding of the programming techniques used in problem solving.

3. The ability to create a program using the Cobol language.

4. A knowledge and understanding of terms commonly used in the data processing field.

5. A knowledge and understanding of file processing techniques commonly used in data processing.

6. The ability to prepare proper documentation for a system of programs.

7. A knowledge and understanding of conversion programs and their use.

8. A knowledge and understanding of various program languages in use throughout the data processing field.

9. A knowledge and understanding of programs available to aid in system operation.

SPECIFIC BLOCK OBJECTIVES

BLOCK I - ORIENTATION

The student must be able to:

1. Explain, orally or in writing, the requirements of this course.
2. Demonstrate an understanding of the safety regulations he must observe by preparing a written explanation of each regulation.
3. Prepare a list of the benefits to be derived from this course.

BLOCK II - SOFTWARE SYSTEMS

The student must be able to:

1. Explain, in writing, the types of conversion programs available and their use.
2. Identify the various program languages available and used throughout the field of data processing in writing.
3. Explain, in writing, the programs used in operating systems.
4. Demonstrate a knowledge and understanding of advanced concepts and terms studied in this course by writing an explanation of each.

BLOCK III - COBOL LANGUAGE STRUCTURE

The student must be able to:

1. Demonstrate a knowledge and understanding of the rules of grammar in Cobol by defining the rules in writing.
2. Exhibit the ability to properly fill out a programming worksheet.
3. Demonstrate a knowledge and understanding of the rules to observe in notation and general formats by writing an explanation of each.

BLOCK IV - COBOL PROGRAMMING LANGUAGE

The student must be able to:

1. Identify, in writing, the various divisions of the Cobol language.
2. Demonstrate a knowledge and understanding of the procedural statements in the Cobol language by writing an explanation of each.

BLOCK V - TABLE HANDLING

The student must be able to:

1. Describe, in writing, the table elements and 1, 2, and 3 dimensional tables.

2. Describe, in writing, the techniques used in specifying occurrence numbers.

BLOCK VI - SEGMENTATION

The student must be able to:

1. List and explain, in writing, the types of segments that may be used in Cobol programming.
2. Explain, in writing, the criteria for priority number assignment.

BLOCK VII - COBOL COMPILER

The student must be able to:

1. Describe, in writing, the data requirements for input to the compiler.
2. Explain, in writing, the difference between an initial compilation and a recompilation.
3. Describe, in writing, the different types of error comments possible and the purpose of each.

BLOCK VIII - ACCESSING AND PROCESSING TECHNIQUES

The student must be able to:

1. Explain, in writing, the sequential access/sequential processing technique as it applies to magnetic files.
2. List the advantages of sequential access/sequential processing.
3. Explain, in writing, the random access/sequential processing technique as it applies to magnetic files.
4. List the advantages of random access/sequential processing.

BLOCK IX - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Software Systems and Cobol - Advanced)

Department 73 - Quin 8025.35

I. ORIENTATION

A. Objectives of the Course
   1. Requirements
   2. Methods of evaluation
   3. Teaching methods

B. Student Responsibilities
   1. Care of equipment
   2. Use of materials
   3. Safety regulations
   4. Class absences

C. Student Benefits
   1. Pride in self
   2. Individual development of skills
   3. Employability

II. SOFTWARE SYSTEMS

A. Conversion Programs
   1. Assembly
   2. Compiler
   3. Generator
   4. Translator

B. Program Languages
   1. Assembler
   2. Compiler
   3. Cobol
   4. Fortran
   5. Algol
   6. Simscript

C. Input/Output Executives
   1. Magnetic tape
   2. Cram
   3. Disc
   4. I/O

D. Operating Systems
   1. Development
   2. Executives
   3. Debugging
   4. Monitoring

E. Advanced Concepts/Terms
   1. Online processing
   2. Offline processing
   3. Time-sharing
   4. Multiprogramming
   5. Simultaneity
   6. Multiprocessing
   7. Real-time
   8. Direct file processing

III. COBOL LANGUAGE STRUCTURE

A. Rules of Grammar
   1. Standard characters
   2. Subsets
   3. Literals

B. Programming Worksheet
   1. Page-line assignment
   2. Continuation line
   3. Comment
   4. Data division

C. Notation and General Formats
   1. Words
   2. Brackets/braces
   3. Ellipsis
   4. Comma
   5. Semicolon
   6. Period

IV. COBOL PROGRAMMING LANGUAGE

A. Divisions
   1. Identification
   2. Environment
   3. Data
   4. Procedure

B. Procedural Statements

   1. Structure
   2. Words
   3. Literals

V. TABLE HANDLING

A. Definition of Tables
   1. Table elements
   2. Dimensional (1-2-3)

V. TABLE HANDLING (Contd.)

B. Specification of Occurrence Numbers
   1. Subscripting
   2. Indexing

VI. SEGMENTATION

A. Types of Segments
   1. Fixed portion
   2. Independent segment

B. Priority Numbers
   1. Logic requirements
   2. Frequency of use
   3. Relationship to other sections
   4. Format

VII. COBOL COMPILER

A. Compiler Input
   1. Required data
   2. Required sequency

B. Initial Compilation and Recompilation
   1. Control strings
   2. Specification worksheet
   3. Listings

C. Error Comments
   1. General
   2. Caution
   3. Abortion
   4. Log messages

VIII. ACCESSING AND PROCESSING TECHNIQUES

A. Sequential Access/Sequential Processing
   1. Magnetic tape
   2. Magnetic disc
   3. Cram

B. Random Access/Sequential Processing
   1. Magnetic disc
   2. Cram

IX. QUINMESTER POST-TEST

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A P P E N D I X

Quinmester Post-Test Samples

Quinmester Post-Test

Name _____ Date _____ Score ___

I. True-False Test Items - Each of the following statements is either true or false. If the statement is true, draw a circle around the letter T following it; if the statement is false, draw a circle around the F. If a statement is false in part, it is entirely false.

1. The smallest element in the Cobol language is the period. T F

2. The Identification Division is the first division to be presented to the Cobol compiler. T F

3. While it is helpful to know the rules of Cobol structure it is not necessary to know them. T F

4. A period or a space may be used to end a sentence. T F

5. Cobol is a language that is similar to the English language. T F

6. Fortran programmers do not need to know or understand algebraic formulas. T F

7. Conversion programs are used to change punched card input to a readable format and output the information on a printer for management information.

8. Generators are a part of the hardware system furnished for programmers. T F

9. An employee is not supposed to have any responsibility for mistakes he may make unless he is caught making them. T F

10. Ethics are very desirable in an employee anywhere but especially in Computer Operators and Programmers T F

11. The compilers are more powerful than the assemblers. T F

12. Input-output executives are part of the programming aids provided by a manufacturer along with the computer hardware. T F

Quinmester Post-Test

Name _____ Date _____ Score ____

II. Completion Test Items - The following questions require brief answers. Read each question carefully and then place your answer in the space provided.

1. What type of program constructs another program from specifically designed sets of instructions by selecting, adjusting, and arranging them in accordance with given specifications _____.

2. Which Cobol division describes the hardware configuration of the compiling computer and the object computer? _____.

3. Which section deals with the information needed to control transmission and handling of data between external media and the object program? _____.

4. Which statement in the Cobol language allows more than one language to be used in the same program? _____.

5. How many different types of Cobol words make up the Cobol language? _____.

6. The procedure-name identifies a section or a paragraph and must always be at the beginning of the section or paragraph it identifies. What must follow a paragraph name? _____.

7. What must follow a section-name? _____.

8. How many sections make up the Data Division? _____.

9. What identifies the beginning of a file description sentence? _____.

10. Which division is considered in determining segmentation requirements for an object program? _____.

Quinmester Post-Test

Name _____ Date _____ Score ____

III. Essay Questions - The questions below require descriptive answers. Read each question carefully before answering. Place your answers in the spaces provided.

1. Why is Fortran called a compiler?

2. What is a Macro-instruction?

3. What are the four divisions of Cobol? Explain their function.

4. What is the function of the Cobol verb OPEN?

5. What is the function of the Cobol verb CLOSE?

6. Explain the meaning of the term 'reserved words' and the programmers' need for caution in using them.

7. Explain what is meant by the term On-line processing.

8. What is the purpose of an I/O executive?

9. Explain the difference between software and hardware.

10. What is nested conditional sentence?

Quinmester Post-Test

Name _____ Date _____ Score ____

IV. Completion Test Items - The following problems require you to determine which term, process, or program has been defined and place the answer in the space provided. Read carefully before answering.

1. _____ An integer whose value identifies a particular element in a table.

2. _____ The section of the data division that describes data items where variable data is temporarily stored or where constant data is stored.

3. _____ The coordinating, directing, or modifying routine that controls the operations of other routines.

4. _____ An instruction which, when assembled or compiled, becomes just one machine instruction.

5. _____ A specific computer language by which business data processing procedures may be described in a standard form. Also is a means for communicating such procedures among individuals.

6. _____ A technique for producing complete data processing reports giving only a description of the desired content and format of the output, along with certain information about the input file.

7. _____ A routine in general support of the operation of a computer. An input/output, diagnostic, tracing, or monitoring routine.

8. _____ A program language which simulates an operating system in fields such as manufacturing, logistics, and transportation by using mathematical models.

9. _____ A software routine which is executed by one computer but which initiates the operations of another computer.

10. _____ A utility routine which runs concurrently with the user's program to provide him with a listing of the order in which his program instructions are executed.

Answer Key to Quinmester Post-Test

I.
1. F
2. T
3. F
4. F
5. T
6. F
7. F
8. F
9. F
10. T
11. T
12. T

II.
1. Generator
2. Environment
3. Input-Output
4. Enter
5. Six (6)
6. Period then a space.
7. Period then a space.
8. Two (2)
9. Level Indicator (FD)
10. Procdure division

III.
1. There is no one-to-one correspondence between the statements written by the programmer and the actual number of machine-language instructions generated to do the actual calculating.

2. When compilation takes place the Macro instruction is converted into several instructions that will perform the operation specified.

3. Identification - contains program name, author, program date, and other documentary information. Environment - names the computer that will compile the program and the computer on which the program will be run. Describes the file media. Data - describes the data to be processed. Procedure - contains the Cobol statements which instruct the computer step by step how to handle the data.

4. Initiates file processing. Checks and/or writes labels.

5. Terminates file processing.

6. Words used for syntactical purposes in a Cobol program. The use of reserved words is restricted.

7. Operation of peripheral devices while under direct control of the central processor. Teller machines and inquiry stations communicate directly with the CP.

8. Software programs provided by the manufacturer to allow the programmer to write programs with simple read/write instructions. Controls the complex operation of input/output devices.

9. Software is actually programs furnished by the manufacturer to be used in the operation of the hardware. Hardware is the physical equipment such as the central processor and peripheral units.

10. An IF statement containing additional IF statements in either the true path or the false path, or both the true and the false paths.

IV. 1. Subscript
2. Working-storage
3. Executive routine
4. Micro
5. Cobol
6. Report Generator
7. Service Routine
8. Simscript
9. Simulator
10. Symbolic Debug System